“

A Dependency Treebank for Kurmanji Kurdish

Universal Dependencies for Kurmanji

Memduh Gökırmak & Francis Morton Tyers

Istanbul Technical University & Moscow Higher School of Economics

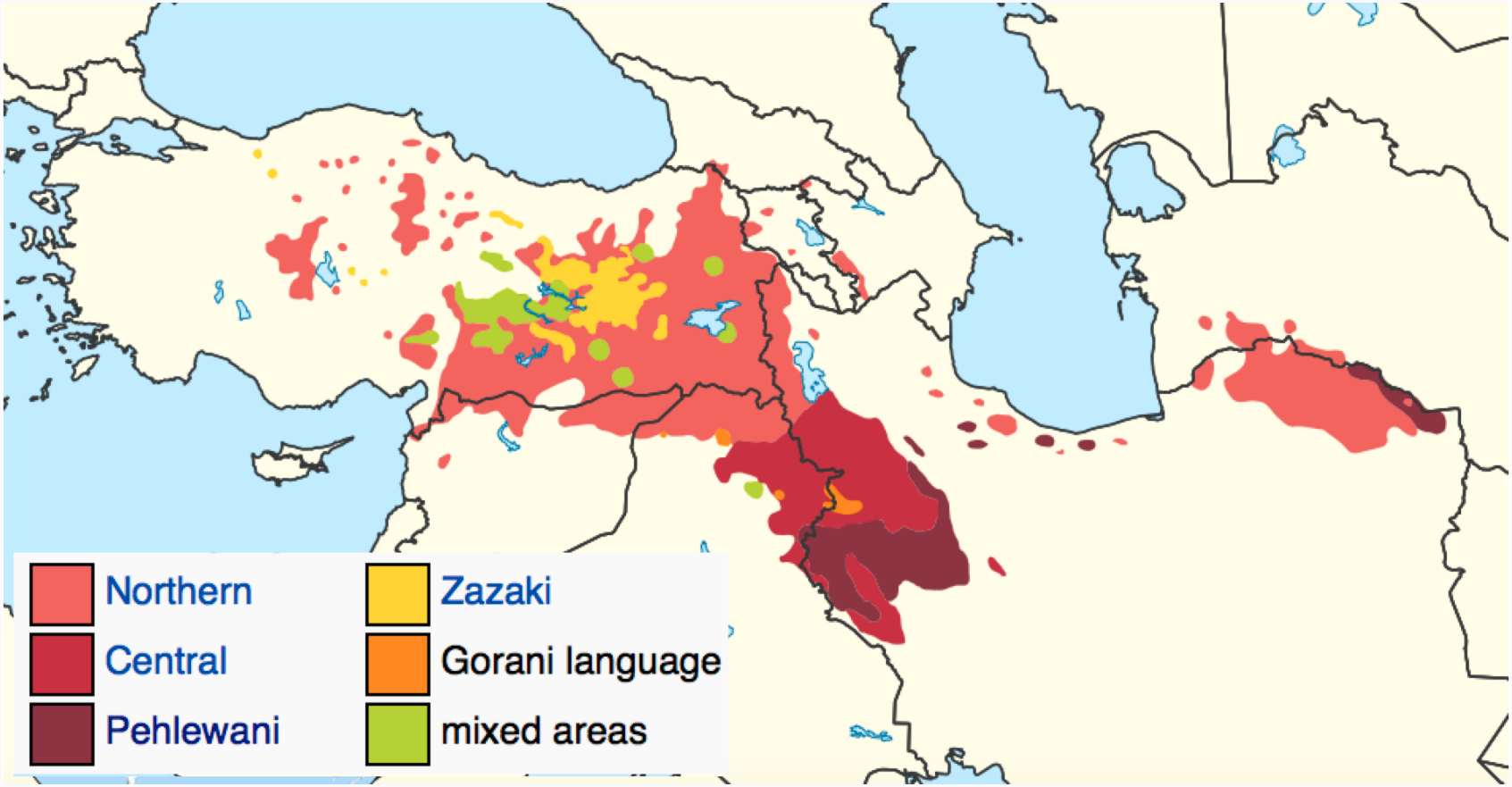
Kurdish - Dialects or Languages

"Kurdish" traditionally refers to five dialects or languages:

- Kurmanji
- Sorani
- Zazaki
- Kelhuri
- Gorani

These groups also have subdialects, such as Suleymaniye Sorani or Behdini Kurmanji.

Areas Kurdish is Traditionally Spoken



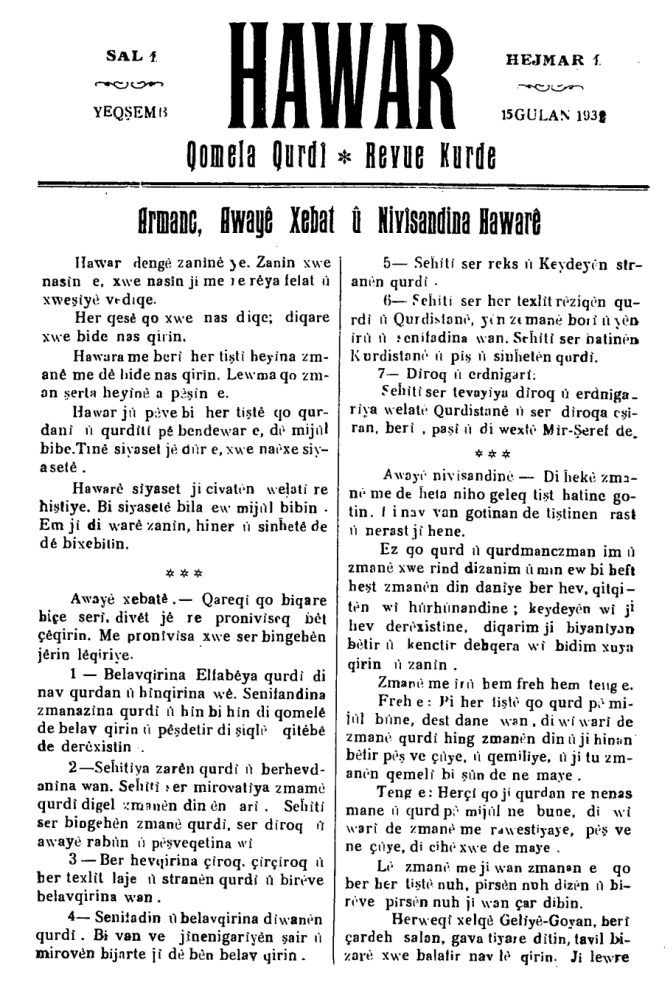
Former Official Status of Kurdish

Soviet Kurdistan existed 1923-1929/30 until it was dissolved under advice of the Foreign Ministry. Kurdish was the official language of the short-lived Republic of Mahabad (1946).

Current Official Status of Kurdish

Now official in Kurdistan Regional Government, recognized in Armenia.

Kurmanji



SAL 1 — HAWAR — HEJMAR 1

YEQSEM[illegible] — 15 GULAN 193[illegible]

Qomela Qurdî * Revue Kurde

Armanc, Awayê Xebat û Nivîsandina Hawarê

Hawar dengê zaninê ye. Zanin xwe nasîn e, xwe nasîn ji me re rêya felat û xweşiyê vedîqe.

Her qesê qo xwe nas dîqe; dîqare xwe bide nas qirin.

Hawara me berî her tiştî heyina zmanê me dê bide nas qirin. Lewma qo zman şerta heyinê a pêşin e.

Hawar jû pêve bi her tiştê qo qurdanî û qurdîtî pê bendewar e, dê mijûl bibe. Tinê siyaset jê dûr e, xwe naêxe siyaseté.

Hawarê siyaset ji civatên welatî re hiştiye. Bi siyaseté bila ew mijûl bibin. Em jî di warê zanîn, hiner û sinhetê de dê bixebitin.

* * *

Awayê xebatê.— Qareqî qo biqare biçe serî, divêt jê re proniviseq bêt çêqirin. Me prontvisa xwe ser bingehên jêrin lêqiriye.

1 — Belavqirina Elfabêya qurdî di nav qurdan û hînqirina wê. Senîtandina zmanazina qurdî û hin bi hin di qomelê de belav qirin û pêşdetir di şiqlê qitêbê de derêxistin.

2—Sehitiya zarên qurdî û berhevdanina wan. Sehîtî ser mirovatiya zmamê qurdî digel zmanên dinên arî. Sehîtî ser bingehên zmanê qurdî, ser diroq û awayê rabûn û pêşveqetina wî

3 — Ber hevqirina çiroq. çirçiroq û her texlît laje û stranên qurdî û birêve belavqirina wan.

4— Senîtadin û belavqirina diwanên qurdî. Bi van ve jînenigariyên şair û mirovên bijarte jî dê bên belav qirin.

5— Sehîtî ser reks û Keydeyên stranên qurdî.

6— Sehîtî ser her texlît rêziqên qurdî û Qurdistanê, yan zemanê borî û yên irû û senîtadina wan. Sehîtî ser natinên Kurdistanê û piş û sinhetên qurdî.

7— Diroq û erdnigarî:

Sehîtî ser tevayiya diroq û erdnigariya welatê Qurdistanê û ser diroqa eşiran, berî, paşî û di wextê Mîr-Şeref de.

* * *

Awayê nivîsandinê — Di hekê zmanê me de heta niho geleq tişt hatine gotin. Lê nav van gotinan de tiştinen rast û nerast jî hene.

Ez qo qurd û qurdmanczman im û zmanê xwe rind dizanim û min ew bi heft heşt zmanên din daniye ber hev, qitqitên wî hûrhûnandine; keydeyên wî jî hev derêxistine, diqarim ji biyantyan bêtir û kenctir debqera wî bidim xuya qirin û zanîn.

Zmanê me irû hem freh hem teng e.

Freh e: Pi her tiştê qo qurd pê mijûl bûne, dest dane wan, di wî warî de zmanê qurdî hing zmanên din û ji hinan bêtir pês ve çûye, û qemiliye, û ji tu zmanên qemelî bi şûn de ne maye.

Teng e: Herçî qo ji qurdan re nenas mane û qurd pê mijûl ne bune, di wî warî de zmanê me rawestiyaye, pês ve ne çûye, di cihê xwe de maye.

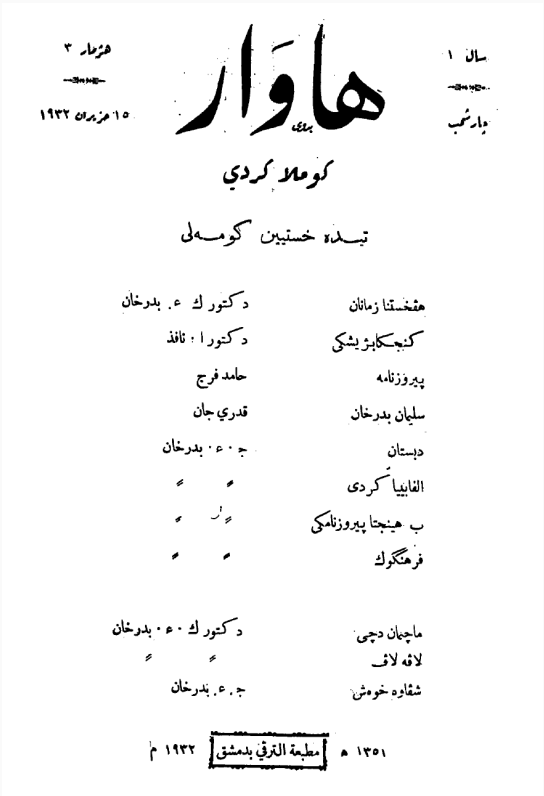
Lê zmanê me ji wan zmanan e qo ber her tiştê nuh, pirsên nuh dizên û birêve pirsên nuh ji wan çar dibin.

Herweqî xelqê Geliyê-Goyan, berî çardeh salan, gava tiyare ditin, tavil bizarê xwe balafir nav lê qirin. Ji lewre

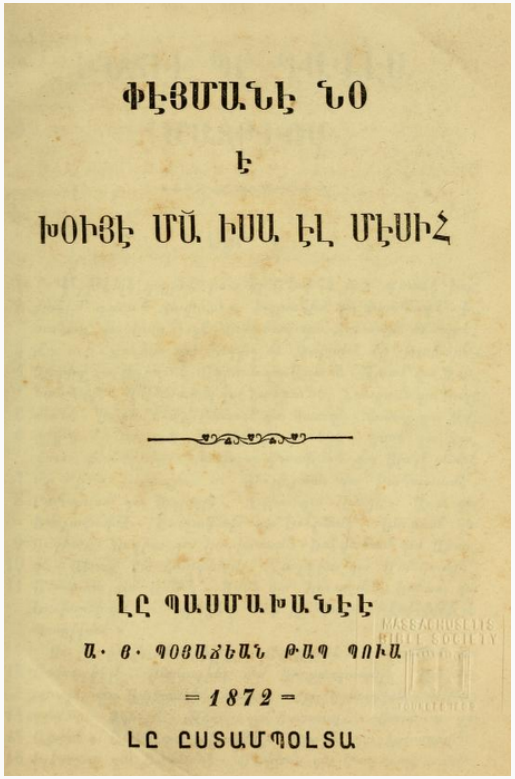
- Widely spoken yet underresourced!
- Most speakers among the five
- Traditionally spoken in four countries, most in Turkey
- Serious efforts to standardize since 1930s
- Latin alphabet adopted in 1930s in *Hawar*

Orthography

Kurmanji has been written with Latin, Arabic, Cyrillic and Armenian alphabets.


هاوار

کومەلا کردي


ՓԷՅՄԱՆԷ ՆՕ

Է

ԽՕՒՅԷ ՄԱ ԻՍԱ ԷԼ ՄԷՍԻՀ

ԼԸ ՊԱՍՄԱԽԱՆԷԷ

Vocabulary

- Written standard very pure(-ified)
- Spoken Kurmanji often heavily influenced by prestige language
- Like Arabic, use over large geography and multiple dialects = large lexicon
- Variants for the word "thus": *wisa*, *wilo*, *welê*, *wiha...*

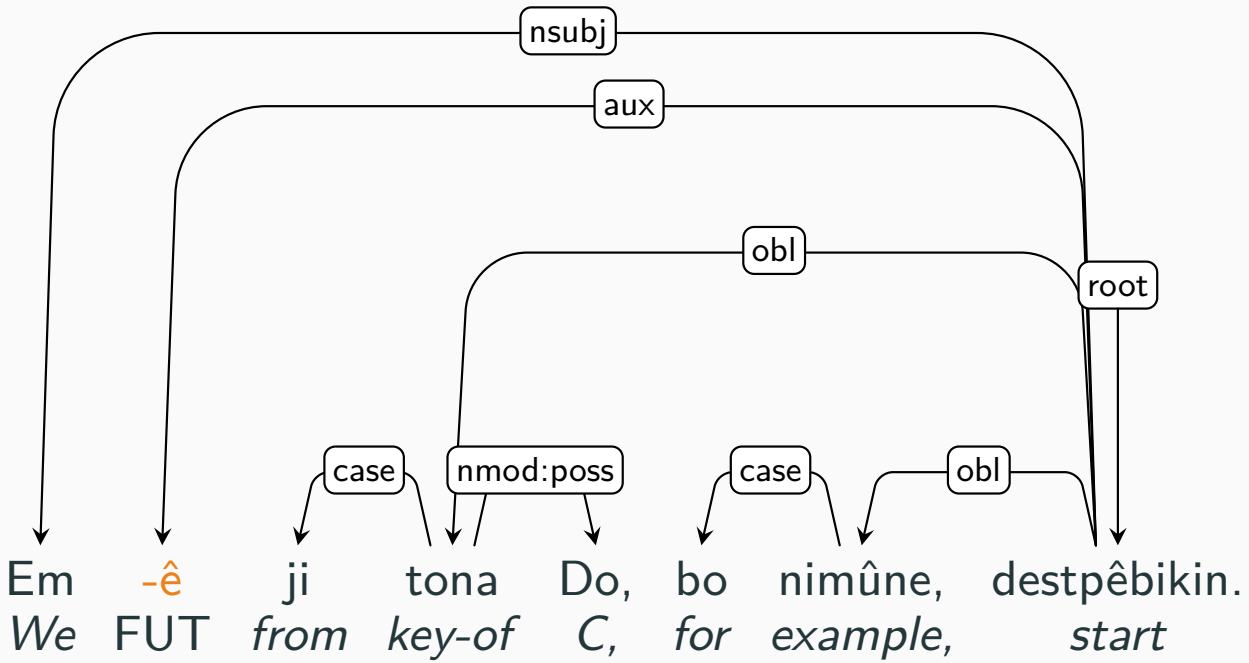
Grammar

Kurmanji has a combination of interesting features that may not have existed together in a single language so far in UD, but existed separately before:

- Nouns inflect for gender, number, case and definiteness
- Split ergative, i.e. in past tenses transitive verbs agree with **objects**
- Future tense formed with a *clitic* after the subject
- Construct case *supersedes* any other case that the nominal might take
- Construct extender to add additional modifiers to a nominal

Future

Emê ji tona Do, bo nimûne, destpêbikin.

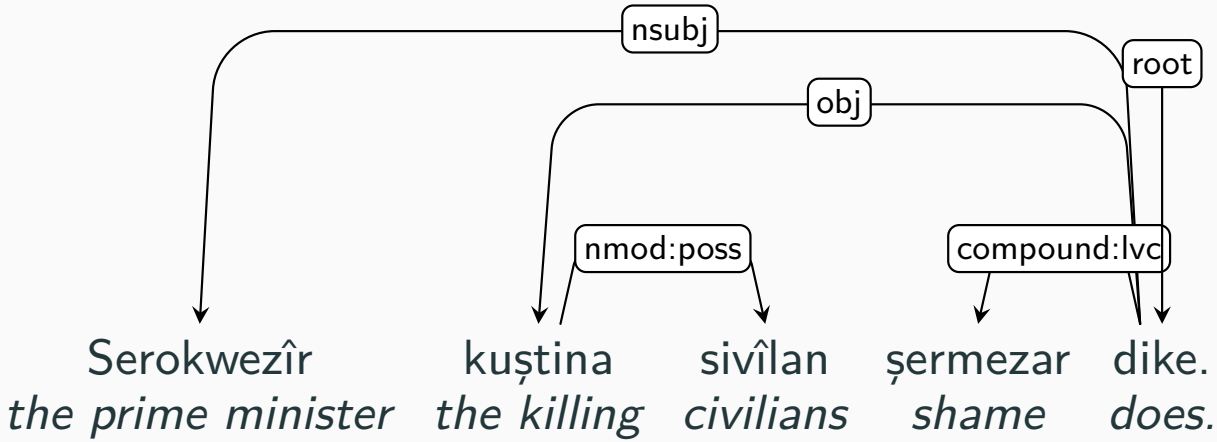


"We will begin, for example, from the key of C."

LVCs

- What is a LVC? (as far as Kurmanji is concerned):
  - Complex predicates
  - Formed of N + V
  - Common in languages Kurmanji has contact with, (Turkish, Persian)
- Conditions:
  - Another patient-like participant other than the nominal involved in the LVC
  - Nominal not inflected like simple argument to verb (i.e. nom instead of obl)
  - Can be considered secondary predication
  - Written together in the infinitive (e.g. in passive, nominal use)
- Relation labeled compound:lvc as in other UD languages with similar constructions

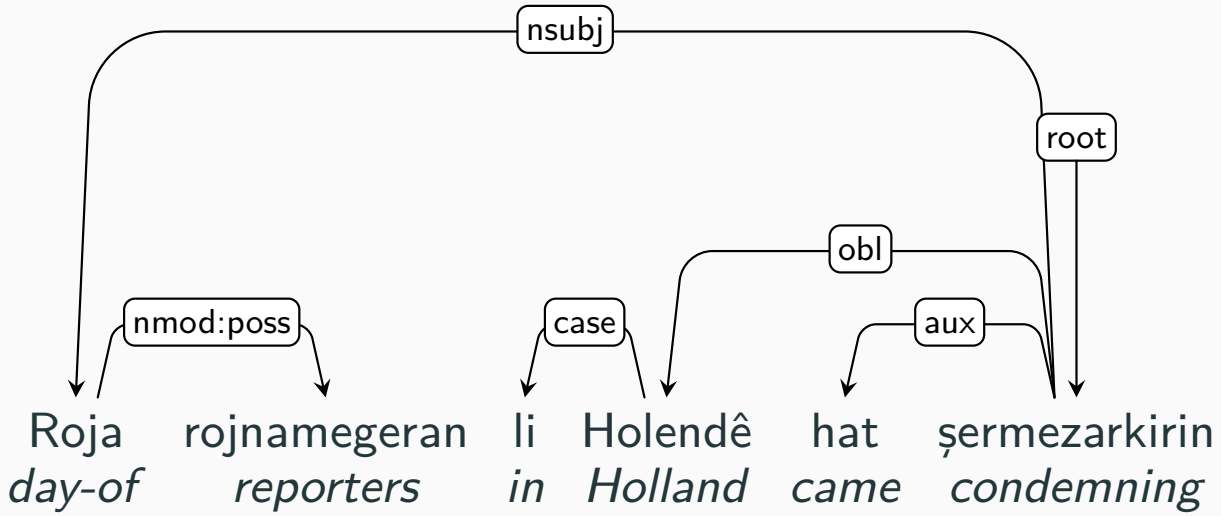
Universal Dependencies



Universal Dependencies (UD) is an attempt to create a unified (as possible) framework for dependency annotation.

- Lots of freely available data!
- Cross-linguistic parsing experiments!
- Visibility for endangered and under-resourced languages

Example with the Infinitive



"Reporters' day was condemned in Holland."

The UD Kurmanji Treebank

Text	S	T	T/S	*non-proj*
Dr. Rweylot	339	4,717	13.9	17.9
Wikipedia	415	5,543	13.4	16.6
Total:	754	10,260	13.2	17.2

Table 1: Composition of the treebank. S is the number of sentences and T the number of tokens. T/S gives the average length of a sentence. The *non-proj* column gives the percentage of non-projective sentences.

Source Material

- We used works in the public domain.
- We wanted to have a corpus that wasn't restricted to a single domain
- The treebank is 50% text from a Sherlock Holmes story and 50% from Wikipedia sentences.

The Adventure of the Speckled Band

The story was published as *Dr. Rweylot* in the supplement to the famous magazine *Hawar*. Now in public domain (Syrian copyright law).

- Sherlock Holmes story translated by Bedirxan himself
- Sometimes vocabulary is old or peculiar
- Some inflections resemble the Behdini dialect
- Better for learning ergativity: conversation/narrative elements

Wikipedia

- Content:
  - Facts, history, biographies of e.g. Hegel or Yalçın Küçük
- Orthography:
  - More standardized than not
  - Still a good deal of variation
  - Spelling mistakes often appeared
- Process:
  - We took sentences fully covered by the analyzer
  - Randomized order of sentences

Hertiştê ku rast e mantiqî ye, hertiştê ku mantiqî ye jî rast e.

Annotation Process

```
"<Ez>"
        "ez" prn pers p1 mf sg nom @nsubj #1->2
"<Şerlok>"
        "Şerlok" np ant m sg nom @root #2->0
"<Holmes>"
        "Holmes" np ant m sg nom @flat #3->2
"<im>"
        "bûn" vbcop pri p1 sg @cop #4->2
"<;>"
        ";" sent @punct #5->2
"<ev>"
        "ev" prn dem mf sp nom @nsubj #6->8
"<jî>"
        "jî" emph @discourse #7->8
"<hevalê>"
        "heval" n m sg con def @parataxis #8->2
"<min>"
        "ez" prn pers p1 mf sg obl @nmod:poss #9->8
"<ê>"
        "yê" con m sg @dep #10->8
"<ezîz>"
        "ezîz" np ant m sg obl @nmod:poss #11->8
"<Wetsin>"
        "Wetsin" np ant m sg nom @appos #12->8
"<e>"
        "bûn" vbcop pri p3 sg @cop #13->8
"<.>"
        "." sent @punct #14->2
```

- Annotated in text editors
- Annotation tools bad at fixing tokenization
- Text was run through an analyzer and a rule-based disambiguator
- Disambiguation verified and dependencies annotated in vim

Kurmanjî Analyzer

```
$ echo Tu wek çêlekê şer dikî | apertium -d . kmr-debug
"<Tu>"
        "tu" prn pers p2 mf sg nom SELECT:197
;       "tû" n f sg nom def SELECT:197
;       "tû" n f pl nom def SELECT:197
"<wek>"
        "wek" pr @case MAP:304
"<çêlekê>"
        "çêl" n f sg obl ind @nmod MAP:302
        "çêl" n f sg con ind @nmod MAP:302
        "çêlek" n f sg obl def @nmod MAP:302
;       "çêlek" n f sg obl dem REMOVE:154
;       "çêlek" n f sg voc def REMOVE:171
"<şer>"
        "şer" n m sg obl def @dobj SELECT:134 MAP:308
        "şêr" n m sg obl def @dobj SELECT:134 MAP:308
;       "şer" n m pl nom def SELECT:134
;       "şêr" n m pl nom def SELECT:134
;       "şêr" n f pl nom def SELECT:134
;       "şer" n m sg nom def SELECT:134 REMOVE:179
;       "şêr" n m sg nom def SELECT:134 REMOVE:179
;       "şêr" n f sg nom def SELECT:134 REMOVE:179
"<dikî>"
        "kirin" vblex tv pri p2 sg
;       "dik" n m sg obl dem REMOVE:154
;       "dîk" n m sg obl dem REMOVE:154
"<.>"
        "." sent @punct MAP:310
```

- Developed as part of GSoC 2016 project
- 85% coverage of Wikipedia, higher on news corpora
- Robust to dialect variation
- Disambiguation with Constraint Grammar (CG)
- $\sim$ 100 disambiguation rules

Evaluation

We evaluated the data using **tenfold** validation. In all models we used **word2vec** trained on Wikipedia.

The analysis was done with:

- Just UDpipe
- UDpipe with a dictionary of all forms from the analyzer

The parsing was done using:

- UDpipe
- BiST
- Maltparser

Parsing Results

Parser	**UAS** [range]	**LAS** [range]
Maltparser	69.4 [64.5, 76.7]	61.5 [57.3, 65.3]
BiST	71.2 [68.1, 74.4]	63.8 [60.7, 67.5]
UDpipe	73.1 [66.9, 77.6]	65.9 [59.6, 68.3]
Maltparser [+dict]	71.2 [67.8, 78.7]	64.0 [60.8, 69.3]
BiST [+dict]	72.7 [69.4, 74.5]	66.3 [63.7, 68.5]
UDpipe [+dict]	**74.3 [72.6, 77.2]**	**67.9 [65.6, 70.1]**

POS Tagging & Features

System	**Lemma**	**POS** [range]	**Morph** [range]
UDpipe	88.3 [85.3, 89.6]	88.2 [85.5, 90.8]	78.6 [75.4, 80.1]
UDpipe [+dict]	**94.6 [93.9, 95.7]**	**93 [91.8, 93.8]**	**85.9 [84.2, 87.6]**

CoNLL Shared Task

Parser	LAS	UAS
C2L2 (Ithaca)	47.53	54.51
IMS (Stuttgart)	46.7	54.73
HIT-SCIR (Harbin)	44.7	52.55
Koç University (İstanbul)	42.11	49.32
LATTICE (Paris)	41.71	51.8
UALING (Tucson)	40.57	48.66
UParse (Edinburgh)	39.76	52.22
Orange – Deskiñ (Lannion)	38.31	50.76
LIMSI-LIPN (Paris)	35.59	48.67
Stanford (Stanford)	35.05	47.71
OpenU NLP Lab (Ra'anana)	34.94	51.24
ParisNLP (Paris)	34.8	47.76
darc (Tübingen)	33.06	46.32
ÚFAL – UDPipe 1.2 (Praha)	32.89	46.33
BASELINE UDPipe 1.1 (Praha)	32.35	46.2

Future Work

- Expanding the treebank
- More strictly standard, modern data, possibly news texts
- Fixes and maintenance
- Work on other Kurdish languages, cross-linguistic experiments